

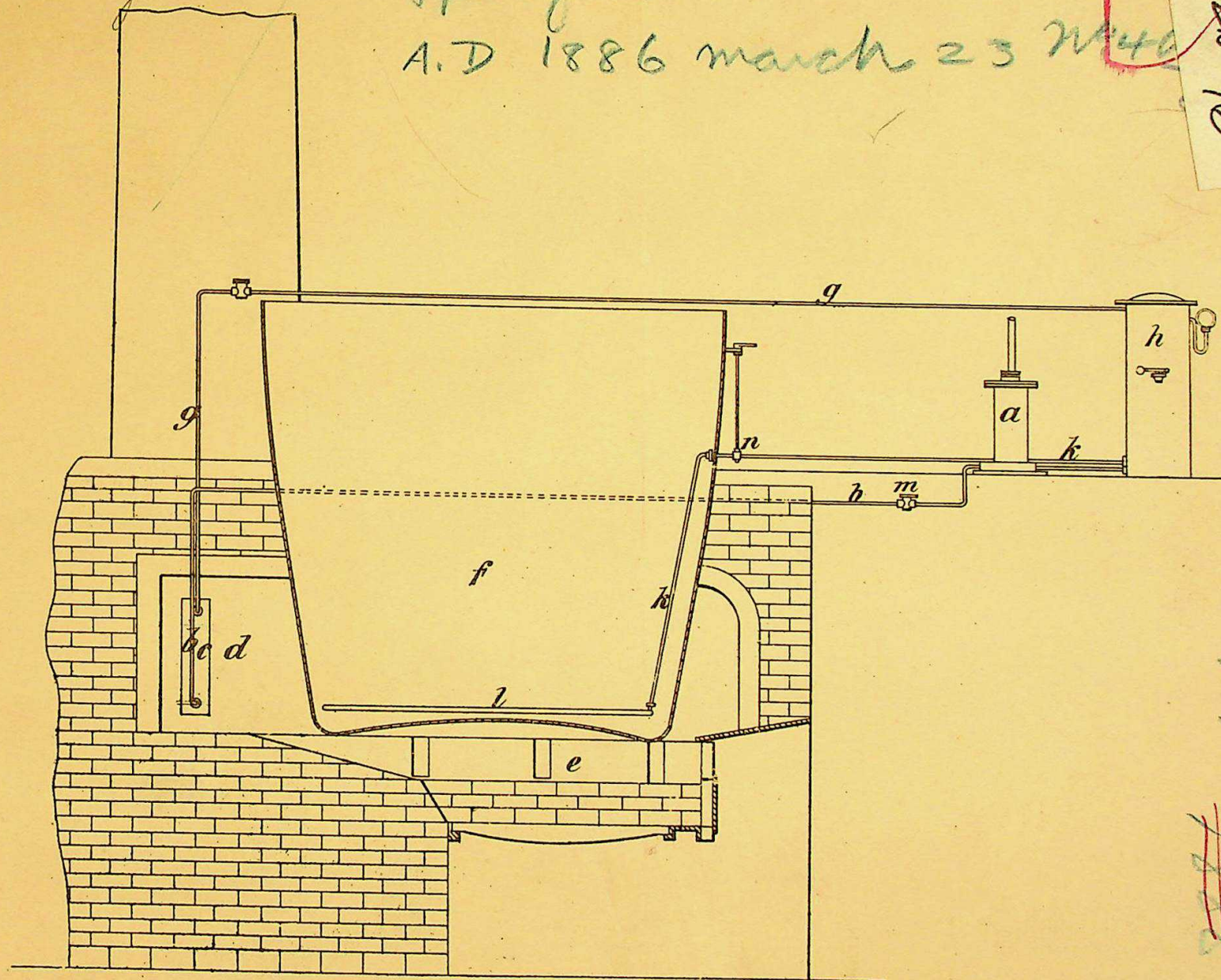
Washing Faulkner & Adlam's complete
specification

Faulkner & Adams' complete
specification

A.D 1886 march 23 No 40

A.D 1886 march 23 No 40

~~426-16~~



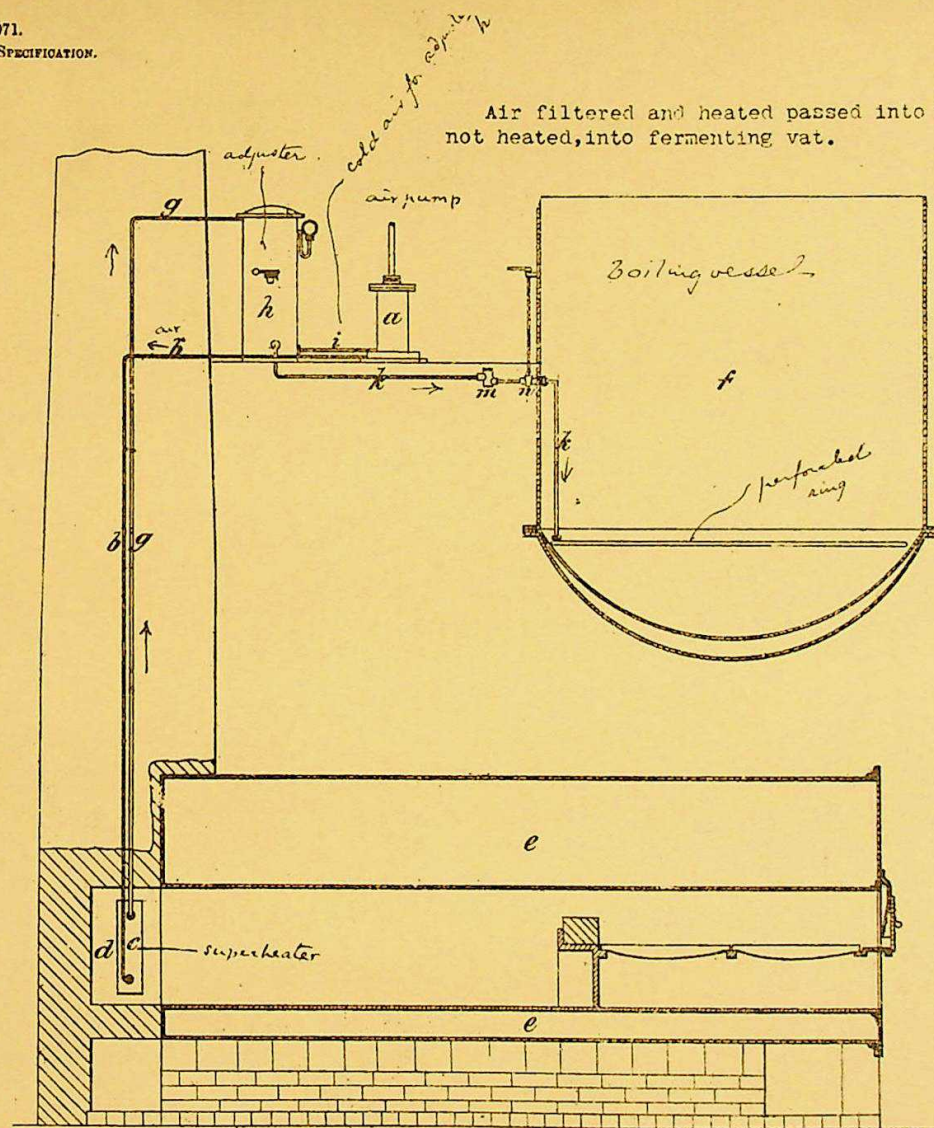
ALCOHOL.
Mashing-
Wort.
Purifying.

1886
4071
~~2871~~

A.D. 1886. MARCH 23. N° 4071.
 FAULKNER & ADLAM'S COMPLETE SPECIFICATION.

(3 SHEETS)
 SHEET 1

Air filtered and heated passed into boiler, hop-back or cooler, or, not heated, into fermenting vat.



1886
 4071

British Patent

ALCOHOL.
 Mashing-
 Wort.
 Purifying.

195
 35

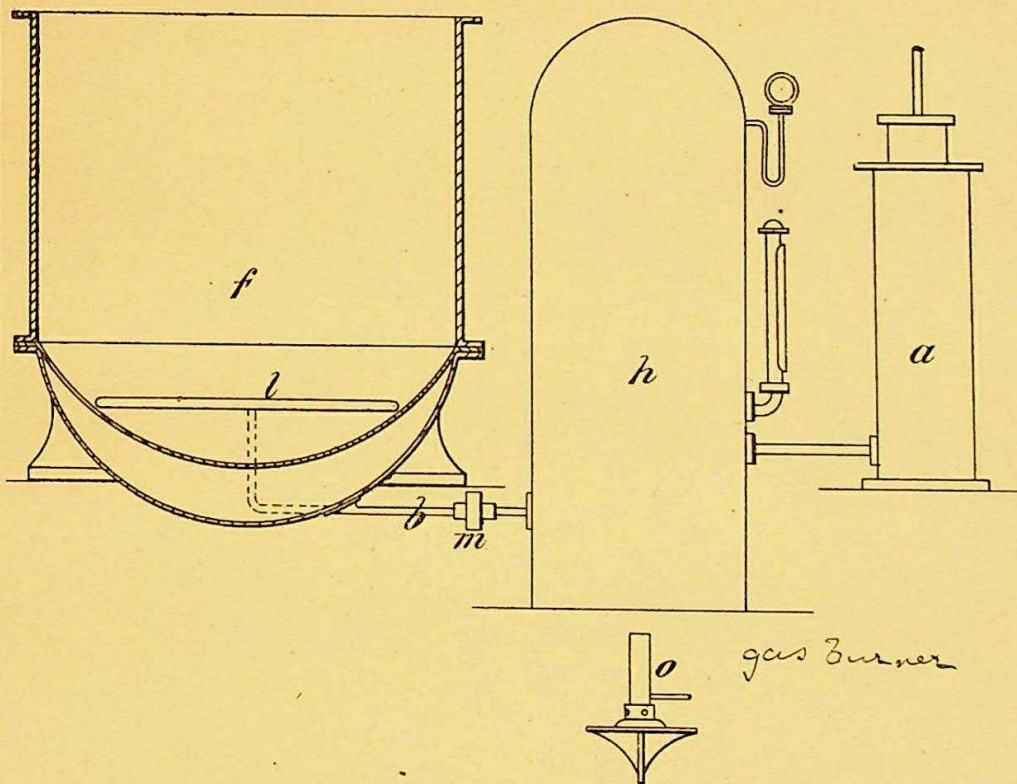
4071
 1886
 9887

ALCOHOL.
Mashing-
Wort.
Purifying.

4071-1886

~~1886~~

Mashing



426-16

52

1886

Mashing

Date of Application, 23rd Mar., 1886.

Complete Left, 22nd Dec., 1886.

Complete Accepted, 25th Jan., 1887.

RECORDED

A.D. 1886, 23rd MARCH. N° 4071.

PROVISIONAL SPECIFICATION.

Improvements in Aërating Brewers' Wort and other Liquids
and in Machinery or Apparatus therefor.

We, FRANK FAULKNER, of Crosswells Brewery, Oldbury, in the County of Worcester, Consulting Brewer, and WILLIAM ADLAM, of Ellbroad Street, in the City and County of Bristol, Engineer, do hereby declare the nature of this invention to be as follows:—

This invention consists, in its relation to brewing, firstly, in the introduction of a
5 forced current or blast of hot air into wort in a heated condition.

The air is preferably introduced into the wort when contained in the boiling copper, but it may, if desired, be introduced at the later stages when the wort is in the hop-back or on the cooler.

The oxygen of the air, raised to a requisite degree of temperature therefor enters
10 into chemical combination with certain deleterious nitrogenous compounds or bodies—constituents of the liquid—which are thereby rendered either directly insoluble or capable of being thrown out of solution and are readily precipitated.

Filtration of the air is not necessary, the degree of heat to which it must be raised
15 in order to efficiently produce the aforesaid result ensuring the destruction of any noxious germs, but filtration may be resorted to as an additional safeguard.

The liquid known as mash-wash in the manufacture of vinegar, as also the acidifying alcoholic wort in the same process, may be aërated with hot air similarly to brewers' wort for the double purpose of precipitating deleterious nitrogenous bodies, and facilitating, in the final stage, the more expeditious acidification of the liquid.

20 The hot aëration may be conveniently effected by means of the following apparatus. By an air pump atmospheric air is supplied to a superheater which may either be situated in a flue of a steam boiler, or in a flue of a fire-heated copper. From the superheater the hot air is conducted to a receiver wherein its temperature may be regulated by the admixture, if required, of cold air supplied from the pump aforesaid.
25 From the receiver the air passes into the copper by a pipe in which is preferably placed a valve designed to open towards the copper, and to close should it be acted upon by a back draught from the copper. A stop cock may be placed between the said valve and the copper so that, in case of need, the communication may be thereby closed.

[Price 11d.]

Faulkner & Adlam's Improvements in Aërating Brewers' Wort and other Liquids, &c.

The air is discharged into the vessel containing the liquid at a point preferably towards the bottom, and a perforated tube may be employed as a convenient means of distributing the air.

Under another arrangement the air is first forced by a pump into a receiver or reservoir which communicates by a pipe with the copper, the communication being governed by an intervening valve which may be adapted to open and admit the air to the liquid when the air has been heated and compressed to the desired degree. The air is heated in the reservoir or heating vessel by a gas jet, or by a fire conveniently brought to bear upon the bottom of the said receiver or reservoir.

Other forms of apparatus may be employed for heating and supplying the air to the liquid to be aërated.

This invention relates, secondly, to the aëration of brewers' wort with cold air at that stage in the process of brewing whereat the wort is undergoing fermentation. Machinery or apparatus the same as or similar to that hereinbefore described with reference to aëration with hot air may be conveniently employed to inject cold air into the fermenting vessel, the gas flame or other heating medium required for hot aëration not being employed.

The introduced air remains free or but slowly combines chemically with the wort extract. The escape of carbonic acid and the development of the yeast are facilitated by its introduction.

It is desirable that the air should be filtered to free it from noxious germs before admitting it to the liquid. For this purpose cotton wool may be conveniently employed and placed therefor in the suction pipe of the air pump.

W. LLOYD WISE,
46, Lincoln's Inn Fields, London, W.C.,
Agent for the Applicants.

Faulkner & Adlam's Improvements in Aërating Brewers' Wort and other Liquids, &c.

COMPLETE SPECIFICATION.

**Improvements in Aërating Brewers' Wort and other Liquids and
in Machinery or Apparatus therefor.**

We, FRANK FAULKNER, of Crosswells Brewery, Oldbury, in the County of Worcester, Consulting Brewer, and WILLIAM ADLAM, of Ellbroad Street, in the City and County of Bristol, Engineer, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained
5 in and by the following statement :—

In its relation to brewing beer, porter and other like liquors, and to other like and analogous processes, this invention consists, firstly, in the introduction of a forced current or blast of hot air into heated wort. The forced current or blast of hot air is introduced into the wort preferably when in the boiling copper, but it may, if desired,
10 be introduced at the later stages when the wort is in the hop-back or on the cooler.

The effect of the introduction of hot air is to cause a combination of the oxygen thereof with certain deleterious compounds or bodies—constituents of the wort—which compounds or bodies are, in consequence, rendered either directly insoluble or capable of being thrown out of solution and are readily precipitated. It is preferable to intro-
15 duce the hot air into the wort while the latter is in the boiling copper for the reason that although, in either case, the precipitation of hurtful nitrogenous bodies takes place, the mechanical action of the air if introduced into the wort when in the hop back is liable to cause disintegration of the hops, and if introduced into wort when on the cooler, the temperature might become too low for the combination to the desired
20 extent of the oxygen with the nitrogenous bodies aforesaid.

Filtration of the air, though not indispensable, inasmuch as the temperature thereof is sufficiently raised as to destroy any noxious germs contained therein, may be resorted to as an additional safeguard.

By similar aëration of the liquid termed in the manufacture of vinegar “mash-
25 wash” and of the acidifying alcoholic wort in the same process, deleterious nitrogenous bodies contained therein are precipitated and, in the final stage, the more expeditious acidification of the liquid is facilitated.

The hot aëration may be conveniently effected by means of various kinds of apparatus variously arranged.

30 According to one arrangement, the air is heated in a superheater conveniently situated either in a flue of the boiler of a steam-heated copper or in the flue of a fire heated copper. The air is supplied to the superheater by means of a pump, and, after having been heated, is conducted from the superheater to a receiver where its temperature may be regulated by the admission of cold air supplied from the pump
35 aforesaid. From the receiver the air passes into the wort and it is preferably introduced therein while the wort is in the heating or boiling copper.

In the pipe by which the air is conducted from the receiver to the wort is placed a valve designed to open to allow the air to pass to the copper and to close if acted upon by a back draught from the copper. By a stop cock situated between the said valve

Faulkner & Adlam's Improvements in Aërating Brewers' Wort and other Liquids, &c.

and the copper the communication may be closed. It is preferred to admit the heated air to the wort at a point towards the bottom of the copper, and, for this purpose, there is placed thereat a perforated tube whereby the air is admitted and distributed.

Under another arrangement the air is first forced by an air pump into a receiver in which it is heated by means of a gas jet or other fire placed below the receiver. From the receiver it is conducted directly to the wort by a pipe in which is a valve adapted to open and permit passage of the air to the liquid when the air has been heated to the required degree.

This invention consists, secondly, in the aëration with cold air of brewers' wort while in the process of fermentation, whereby the escape of carbonic acid and the development of the yeast are facilitated.

A convenient arrangement of apparatus for this purpose consists of an air pump by which air is supplied to a receiver which is in communication with the fermenting vessels.

It is desirable that the cold air should be filtered and thereby freed from noxious germs before it is admitted to the wort. This may be conveniently effected by placing cotton wool in the suction pipe of the air pump.

Referring to the accompanying sheets of illustrated drawings, the figure on sheet 1 thereof represents a series of apparatus for effecting aëration of brewers' wort with hot air, arranged in accordance with one method of carrying this invention into practical effect.

By the air pump *a*, atmospheric air is supplied through the pipe *b*, direct to the superheater *c*, situated in the flue *d* of the boiler *e* by which steam is supplied to heat the contents of the copper *f*. From the superheater *c* the heated air is conducted by the pipe *g* to the receiver *h* wherein its temperature may be adjusted by the introduction, by a pipe *i*, of cold air from the air pump *a* aforesaid. Thence by the pipe *k*, the air is conducted to the copper *f* and admitted to the wort contained therein through the perforated ring shaped pipe or distributor *l*. Between the copper *f* and the receiver *h* there is in the pipe *k* a valve *m* so designed as to open to allow the air to pass to the copper *f* but to close under the influence of any back draught from the copper. In the pipe *k* there is also a stop cock *n*.

The oxygen of the heated air when admitted to the heated wort enters into chemical combination with certain nitrogenous compounds or bodies which are constituents of the wort and thereby these bodies are rendered either directly insoluble or made capable of being thrown out of solution.

In lieu of aërating the wort when in the copper, aëration thereof may be effected at the subsequent stages when the wort is in the hop-back or on the cooler, but although, in either case, precipitation of the objectionable and deleterious bodies aforesaid results, there is a liability in the one case of undue disintegration of the hop by the mechanical action of the air, and, in the other case, the temperature might become too low for the combination to the desired extent of the oxygen and the compounds or bodies. Hence it is preferable to aërate the wort when in the heating or boiling vessel.

In the figure shown at Sheet 2 of the appended drawings the superheater *c* is situated in the flue *d* of the furnace *e* of the fire heated copper *f*. Otherwise the apparatus and the arrangement thereof are generally substantially the same as above described with reference to the figure represented on Sheet 1.

The figure shown on Sheet 3 of the appended drawings illustrates another arrangement under which the air supplied by the pump *a* to the receiver *h* is heated through the medium of a gas burner *o* placed below the said receiver. Instead of the gas burner *o* other means may be adopted to heat the air in the receiver, as, for instance, a furnace or fire conveniently placed below the receiver. From the receiver *h* the air is conducted to the copper *f* by the pipe *b* in which is the valve *m* designed to open and allow the air to pass to the copper when it has been heated to the requisite degree.

For carrying into effect the aëration with cold air of brewers' wort while in process of fermentation, in which this invention further consists, a series and arrangement of

Faulkner & Adlam's Improvements in Aërating Brewers' Wort and other Liquids, &c.

apparatus similar to that hereinbefore described with reference to hot aëration may be conveniently employed except, of course, that the air receiver supplied by the air pump is not exposed to the action of heat.

To free the cold air from noxious germs previously to admitting it to the fermenting vessels, it may be filtered by being passed through cotton wool or any suitable medium conveniently placed in the suction pipe of the air pump. The air introduced into the wort in process of fermentation remains free or only slowly combines chemically with the wort. It facilitates the escape of carbonic acid and the development of yeast which but for the free air thus supplied is liable to become inert in action.

10 Having now particularly described and ascertained the nature of this invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. In the process of brewing ale porter and other like liquors, and in similar and analagous processes, the introduction into the heated wort when contained either in the heating or boiling copper or at the later stages in the process of brewing when the
15 wort is in the "hop back" or on the cooler, of a forced current of hot air for the purpose of rendering insoluble the deleterious nitrogenous compounds or bodies constituents, of the wort, or rendering the same capable of being thrown out of solution and for the purpose of precipitating of such bodies substantially as hereinbefore described.

2. In the process of vinegar manufacture, the introduction into the liquid termed
20 "mash-wash" of a forced current or blast of hot air for the purpose of rendering insoluble the deleterious nitrogenous constituents thereof or rendering the same capable of being thrown out of solution, and for the purpose of facilitating precipitation of such bodies, substantially as hereinbefore described.

3. In the process of vinegar manufacture the introduction into the liquid termed
25 acidifying wash of a forced current or blast of hot air for the purpose of expediting the acidification of the liquid, substantially as described.

4. In the process of brewing ale, porter and other like liquors, and in the manufacture of vinegar, and in other like or analogous processes, the use of apparatus for
30 obtaining heating and supplying a forced current of air for the hot aëration of wort, consisting of an air pump such as *a*, a superheater such as *c* wherein the air is heated, a receiver such as *h* wherein the heated air is stored and its temperature adjusted, and suitable pipes or conduits for communication in due order between the different vessels and that containing the wort, and valves and cocks for regulating and controlling the communication, substantially as hereinbefore described with reference to
35 the figures shewn on Sheets 1 and 2 of the appended drawings and also with reference to the modification shown in the figure on Sheet 3 of the said drawings.

5. In the process of brewing ale, porter and other like liquors, and in analogous processes, the introduction into wort when in the fermenting stage, of a forced current
40 or blast of cold air for the purpose of facilitating the escape of carbonic acid and for the development of any inert yeast by supplying free air thereto, substantially as hereinbefore described.

6. In the process of brewing ale, porter and other like liquors, and in other like or analogous processes, the use of apparatus for obtaining and supplying a forced current
45 or blast of cold air for the cold aëration of wort in the fermenting stage, consisting of an air pump, a receiver or reservoir supplied with air by the pump, and suitable pipes or conduits for communication in due order between the different vessels and that containing the wort, and valves and cocks for regulating and controlling the communication substantially as hereinbefore set forth.

50

W. LLOYD WISE,
46, Lincoln's Inn Fields, London, W.C.,
Agent for the Applicants.

LONDON: Printed by DARLING AND SON.
For Her Majesty's Stationery Office.

1887.